

# Karst Water Resources in Southwest China: Case Study from the East Plateau, Mengzi and Kaiyuan Counties, Yunnan, China

By Chris Groves<sup>1</sup>, Jiang Yongjun<sup>2,1</sup>, Pat Kambesis<sup>1</sup>, Yuan Daoxian<sup>2,1</sup> Amelia Chung<sup>3,1</sup>

<sup>1</sup>China Environmental Health Project, Hoffman Environmental Research Institute, Department of Geography and Geology, Western Kentucky University, Bowling Green, KY 42101 USA

<sup>2</sup>Institute of Karst and Rehabilitation of Rock Deserts, Department of Geographical Sciences, Southwest University of China, Chongqing, China

<sup>3</sup>International Institute of Rural Reconstruction, Kunming, Yunnan, China

## Abstract

The East Plateau is a fault-bounded plateau with an altitude of about 2000 meters in far southern Yunnan, near China's border with Vietnam. It lies almost on the boundary of the Indian and Eurasian plates to the east of the Himalayan chain, and has a surface underlain in part by pure carbonate rocks of the middle Triassic Gejiu Group that form variations of peak cluster-depression karst morphology over some 250 square kilometers.

Serious water resource challenges occur on the plateau because of the well-developed karst, with little surface water available during the monsoon-climate's dry season. Only about 15 percent of the year's rainfall typically falls between November and May. Extensive deforestation and associated soil loss starting in the late 1950's has also severely diminished epikarstic storage, so that many villages established years ago with epikarstic springs are now without continuously reliable water supply. The water table is as much as 400 meter below the surface of the plateau. The 30,000 or so residents on the plateau are largely of Hani and Yi minority nationality, and typically very poor, in most cases subsistence farmers with incomes below China's poverty level of 680 yuan (\$91) per year.

With major support from the US Agency for International Development and the ENVIRON Foundation, Western Kentucky University's China Environmental Health Project is working to increase the technical infrastructure for karst water resource development in southwest China through partnerships with Southwest University in Chongqing Municipality as well as government scientists in the karst-rich provinces of the southwest. Yunnan's East Plateau is serving as demonstration site, both in an effort to increase local environmental health and awareness, as well to serve as a training vehicle for our Chinese partners in state-of-the-art methods of karst hydrogeology, including associated skills and infrastructure in cave survey, fluorescent dye tracing, and geographic information systems (GIS), and expedition management in remote rural areas. New laboratories were implemented and training workshops held at the university, followed by expeditions to the Plateau in early spring 2007 and 2008, late in the winter dry season each year.

This applied work has a challenging human element, and we are working closely with the International Institute of Rural Reconstruction and a local, non-government organization (NGO), the Honghe Prefecture Minority Nationality Research Institute, to develop local stakeholder networks with the team members, rural residents, and local governments to effectively engage community participation.